

CLAIMS

What is claimed is:

- 5     1.     A column tray assembly, comprising:  
          a tray provided with a plurality of passages; and  
          a plurality of superstructures mounted to said tray, each superstructure  
communicating with one of said passages; wherein  
          said superstructures are provided with gas penetration holes having orifices  
10    oriented transverse to said tray.
2.     The column tray assembly according to claim 1, wherein said superstructures  
are removably mounted to said tray.
- 15    3.     The column tray assembly according to claim 1, further comprising a  
structured packing supported by said superstructures.
4.     The column tray assembly according to claim 1, further comprising  
at least one grid supported by said superstructures; and  
20    at least one or more of structured packing and random packing provided on  
said grid.
5.     The column tray assembly according to claim 1, wherein said superstructures  
are embedded between one or more of structured packing and random packing.  
25    6.     The column tray assembly according to claim 1, wherein the tray is flat.
7.     The column tray assembly according to claim 1, wherein the tray and the  
superstructures are both formed of corrosion-resistant materials.

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8. The column tray assembly according to claim 1, wherein the orifices are slots provided on top portions of the superstructures.
9. The column tray assembly according to claim 1, wherein the tray is provided with a plurality of holes in addition to said passages.
10. The column tray assembly according to claim 9, wherein said plurality of holes each have a smaller diameter than a diameter of said passages.
11. The column tray assembly according to claim 10, further comprising distributor cups arranged in the holes.
12. The column tray assembly according to claim 11, further comprising distributor tubes connected to said distributor cups so as to provide for targeted liquid distribution over packing positioned below said tray.
13. The column tray assembly according claim 1, wherein the superstructures have sidewalls that are substantially perpendicular to the tray, and the gas penetration holes are formed in said sidewalls.
14. The column tray assembly according to claim 1, wherein the gas penetration holes comprise longitudinal slots formed in said superstructures.
15. The column tray assembly according to claim 14, wherein the longitudinal slots extend over substantially the total height of the superstructures.
16. The column tray assembly according to claim 14, wherein, when configured and used as any one or more of a liquid distributor, liquid redistributor and a liquid collector, the longitudinal slots extend from above a liquid level formed during such use, to an upper end region of the superstructures.

17. The column tray assembly according to claim 1, wherein the passages have a circular, polygonal, rectangular or square cross-section, and the sidewalls of the superstructures have a corresponding shape.
18. The column tray assembly according to claim 1, further comprising hoods provided on said superstructures.
19. The column tray assembly according to claim 1, wherein the tray is formed from one or more of the group consisting of: steel with an enamel coating, steel with a coating of a corrosion-resistant plastic, corrosion-resistant plastic, tantalum and corrosion-resistant special alloys.
20. The column tray assembly according to claim 19, wherein the plastic comprises one from the group of: polytetrafluoroethylene (PTFE), perfluoroalkoxy polymers (PFA), polyvinylidene fluoride (PVDF), polyethylene (PE), and mixtures thereof.
21. The column tray assembly according to claim 1, wherein the superstructures are formed from one or more of the group consisting of: glass, corrosion-resistant plastic, tantalum and corrosion-resistant special alloys.
22. The column tray assembly according to claim 21, wherein the plastic comprises one from the group of: polytetrafluoroethylene (PTFE), perfluoroalkoxy polymers (PFA), polyvinylidene fluoride (PVDF), polyethylene (PE), and mixtures thereof.
23. The column tray assembly according to claim 1, wherein at least one of said superstructures extends below a plane of the tray and has a lower end

configured as an outflow pipe.

- 5           24.    The column tray assembly according to claim 1, in combination with a plurality of different superstructures, each of said different superstructures capable of being mounted to said tray.
- 10           25.    The column tray assembly according to claim 1, selectively convertible into any of a support tray, a liquid distributor, a liquid redistributor, a liquid collector and a mass transfer tray, upon mounting one or more suitable appropriate superstructures to the tray.
26.    The column tray assembly according to claim 1, wherein the superstructures are chimneys.
- 15           27.    The column tray assembly according to claim 26 configured as a liquid collector, and further comprising at least one outflow pipe, and wherein said passages are the only openings formed in said tray through which gas or liquid pass during use.
- 20           28.    The column tray assembly according to claim 26, wherein the tray further comprises a plurality of holes having a diameter smaller than the diameters of the passages.
- 25           29.    The column tray assembly according to claim 28 configured as a liquid distributor or liquid redistributor, and further comprising distributor cups or overflow bushes, or both, installed in said plurality of holes.
30.    The column tray assembly according to claim 28 configured as a liquid collector, wherein said plurality of holes are closed.

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31. The column tray assembly according to claim 28, wherein the chimneys are provided with longitudinal slots substantially along their entire height.
- 5 32. The column tray assembly according to claim 31, further comprising distributor cups or overflow bushes, or both, installed in said plurality of holes, whereby the column tray is suitable for use both as a support tray and also as liquid distributor.
- 10 33. The column tray assembly according to claim 28 configured as a mass transfer tray, wherein:  
at least one passages is provided with an outflow pipe;  
the remaining passages are blocked; and  
bubble-caps are installed in said plurality of holes.
- 15 34. A column comprising:  
a column tray assembly comprising:  
a tray provided with at least one passage; and  
at least one superstructure removably mounted to said tray, said  
superstructure communicating with said at least one passage; wherein  
20 said superstructure is provided with gas penetration holes having orifices oriented transverse to said tray.
- 25 35. The column according to claim 34, and  
lined with one or more of enamel, corrosion-resistant plastic,  
polytetrafluoroethylene (PTFE), perfluoroalkoxy polymers (PFA),  
polyvinylidene fluoride (PVDF), polyethylene (PE), or  
formed from one of more of glass, tantalum and special alloys.
- 30 36. The column according to claim 34, wherein an area of the tray is greater than or equal to a cross-sectional area of the column.

37. A collection of column components comprising:

at least one tray having passages formed therein;

at least two different superstructures, each superstructure configured and dimensioned to be removably mounted to said tray such that it communicates with one

5 of said passages, wherein

each superstructure is provided with gas penetration holes having orifices oriented transverse to said tray, when said each superstructure is mounted to said tray, and

the tray is formed from one or more of the group consisting of: steel with  
10 an enamel coating, steel with a coating of a corrosion-resistant plastic, corrosion-resistant plastic, tantalum and corrosion-resistant special alloys.